CLAIMS

1. A method of laser marking comprising:

arranging a sample of target material spaced apart from a sample of markable material;

directing irradiation having an energy fluence above the ablation threshold of the target material onto the target material such that at least some of the target material is ablated and thrown onto a surface of the markable material; and

subjecting said surface of the markable material to irradiation having an energy fluence below the ablation threshold of the markable material to induce an interaction between the ablated material and the surface which marks the surface with the ablated material.

2. A method of laser marking according to claim 1, in which the markable material is arranged with respect to the target material such that the irradiation is directed via the markable material and onto the target material.

3. A method of laser marking according to claim 2, in which the markable material is substantially transparent to the irradiation.

4. A method of laser marking according to claim 1, in which the irradiation is provided as a train of pulses.

5. A method of laser marking according to claim 4, in which the ablation and the interaction are achieved by the same pulse of irradiation.

6. A method of laser marking according to claim 4, in which the ablation and interaction are achieved by different pulses of irradiation.

7. A method of laser marking according to claim 1, in which the method further comprises monitoring the fluence of the irradiation.

8. A method of laser marking according to claim 7, in which the method further comprises controlling the fluence of the irradiation in response to the monitoring.

9. A method of laser marking according to claim 1, in which the method further comprises detecting and analysing the amount of irradiation reflected and scattered from the surface, the target material and the ablated material.

10. A method of laser marking according to claim 9, in which the method further comprises adjusting the spacing between the target material and the markable material in response to the analysis of the reflected and scattered irradiation to determine that the ablated material is being thrown onto the surface of the markable material.

11. A method of laser marking according to claim 1, in which the method further comprises setting the spacing between the target material and the markable material so that the amount of ablated material thrown onto the surface of the markable material is sufficient to mark the surface with a mark of a desired tone.

12. A method of laser marking according to claim 1, in which the method further comprises setting the fluence of the irradiation so that the amount of target material which is ablated and thrown onto the surface of the markable material is sufficient to mark the surface with a mark of a desired tone.

13. A method of laser marking according to claim 1, in which the method further comprises moving the directed irradiation and the sample of markable material relative to one another so as to mark the surface of the markable material in accordance with a desired pattern.

14. A method of laser marking in accordance with claim 1, in which the target material is one of copper, silicon, aluminium, silver, chromium, titanium, tungsten and other metal, semiconductor or other solid substrates.

15. A method of laser marking according to claim 1, in which the irradiation is optical irradiation.

16. Apparatus for laser marking a sample of markable material, comprising:
a sample of target material; and
a irradiation source operable to generate irradiation to:
ablate at least part of the target material so that the ablated material is thrown onto the surface of a sample of markable material spaced apart from the sample of target material; and
irradiate the surface of the sample of the markable material to induce an interaction between the ablated material and the surface which marks the surface with the ablated material.

17. Apparatus for laser marking according to claim 16, and further comprising a controller operable to control at least the operation of the irradiation source.

18. Apparatus for laser marking according to claim 16, and further comprising scanning apparatus controlled by the controller and operable to provide relative movement between the irradiation and the sample of markable material so that the surface can be marked in accordance with a desired pattern.

19. Apparatus for laser marking according to claim 17, and further comprising scanning apparatus controlled by the controller and operable to provide relative movement between the irradiation and the sample of markable material so that the surface can be marked in accordance with a desired pattern.

20. Apparatus for laser marking according to claim 18, in which the scanning apparatus comprises a galvanometer-based beam scanner operable to scan the irradiation.

21. Apparatus for laser marking according to claim 19, in which the scanning apparatus comprises a galvanometer-based beam scanner operable to scan the irradiation.

22. Apparatus for laser marking according to claim 16, and further comprising an energy meter operable to measure the energy of the irradiation and pass the measurements to the controller, the controller being operable to control the irradiation source in response to the measurements.

23. Apparatus for laser marking according to claim 16, and further comprising an adjustable mount operable to adjust the spacing between the sample of target material and the sample of markable material.

24. Apparatus for laser marking according to claim 22, and further comprising a detector operable to detect irradiation scattered and reflected from the surface of the markable material, the target material and the ablated material and pass a detection signal to the controller, the controller being operable to control the adjustable mount in response to the detection signal.

25. Apparatus for laser marking according to claim 16, in which the irradiation source is operable to generate optical irradiation.